Aerial Survey Highlights for Colorado 2015

Aerial detection surveys of tree killing or damaging insects and diseases are conducted annually over Colorado's forest lands. This is a cooperative effort between the US Forest Service and the Colorado State Forest Service. In 2015, 27.4 million acres were surveyed by 8 trained federal and state surveyors. Highlights of the survey by damage agent are reported below. In 2015, all reported agents are insects that kill and/or defoliate trees. This report includes only forest damage that is visible from the air.

Mountain Pine Beetle

- Mountain pine beetle has affected about 3.4 million acres in Colorado since 1996.

- The epidemic has ended in many areas of Colorado (Figure 1), as larger pine trees have been depleted in the core outbreak areas. The epidemic has also ended along the southern and western fronts despite availability of susceptible host trees (Figure 2).

- The mountain pine beetle affected area in Colorado expanded by only 4,000 acres in all host types and was active on 5,000 acres. Nearly 2,000 acres of mortality was observed in high elevation limber pines which occur in more scattered stands than other susceptible pines.

- 1,800 acres of lodgepole pine mortality along the Continental Divide in southern Colorado and adjacent to spruce beetle areas is noteworthy and may represent one or several western bark beetle species.

- Mountain pine beetle activity declined considerably in the northern Front Range counties of Larimer, with 460 acres of lodgepole and ponderosa pine mortality and Boulder, with 150 acres of high elevation limber pine mortality.

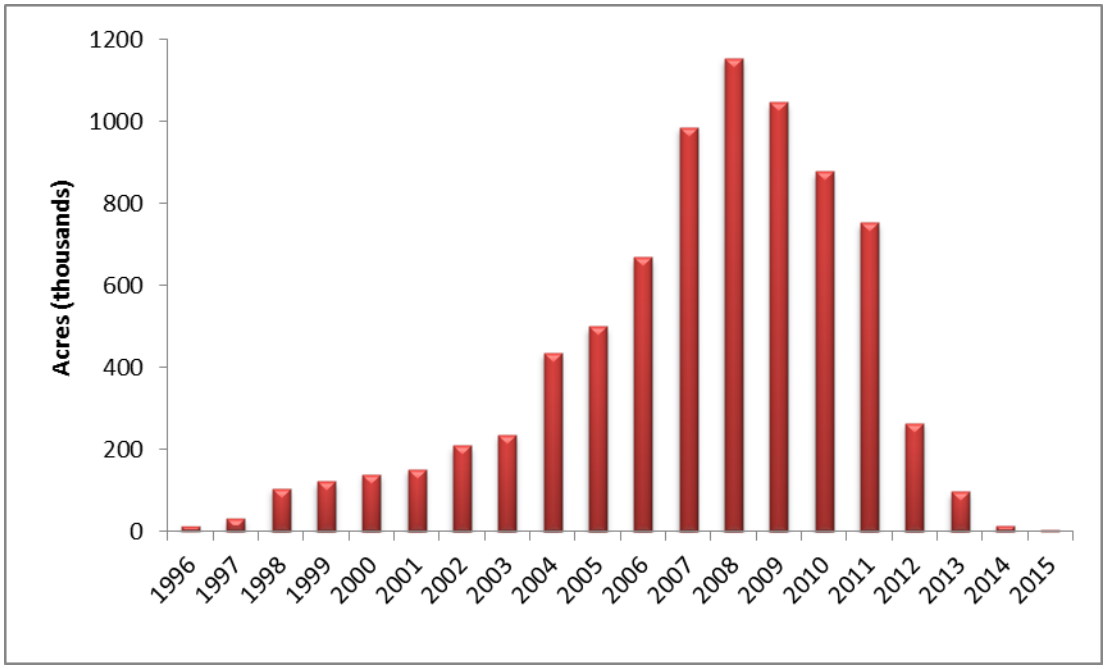

Figure 1. Annual acres affected by mountain pine beetle in Colorado 1996-2015.

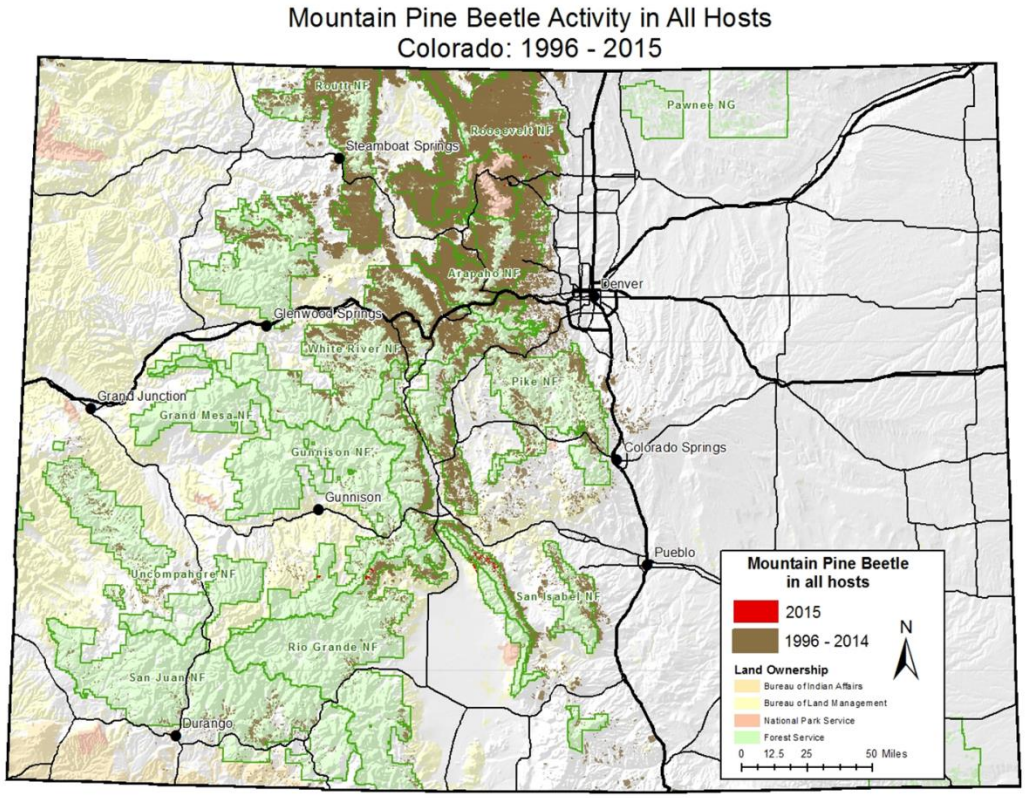

Figure 2. Mountain pine beetle activity in Colorado 1996-2015.

Spruce Beetle

- Since 1996, spruce beetle has affected approximately 1,579,000 acres to varying degrees in Colorado.

- Spruce beetle activity was detected on 409,000 acres in Colorado in 2015. Of these, 182,000 acres are in areas not previously mapped as having spruce beetle activity (new acres*). This epidemic continues to expand (Figures 3 and 4). A heavily impacted stand with current beetle activity is shown in Figure 5.

- The spruce beetle epidemic is expanding most rapidly in southern Colorado's Forests and impacts many thousands of acres. Areas affected are found from the La Garita Wilderness Area to north of Cottonwood Pass, the Sangre de Cristo and Wet Mountains, as well as south to the Colorado border and into New Mexico. Aerial survey in south central Colorado showed spruce beetle epidemics expanded on the San Juan (16,000 new acres on 46,000 active acres**), Rio Grande (34,000 new acres on 137,000 active acres), Gunnison (46,000 new acres on 75,000 active acres), and San Isabel (27,000 new acres on 46,000 active acres) National Forests. Scattered activity continues on the western end of the White River National Forest (1,000 new acres on 1,400 active acres). Ground surveys near the Continental Divide in southern Colorado show spruce beetle is killing lodgepole pine in areas near infested spruce stands.

- In northern Colorado, spruce beetle caused new tree mortality from the Rabbit Ears Range and east through the southern Medicine Bow Mountains and into northern Rocky Mountain National Park. Spruce beetle is found on 19,000 new acres and is active on 40,000 acres in Grand, Jackson, and Larimer Counties.

  * new acres indicates an area of insect or disease activity not previously mapped during aerial detection survey

  ** active acres indicate the entirety of an area of insect of disease activity including areas that may have been impacted in previous years

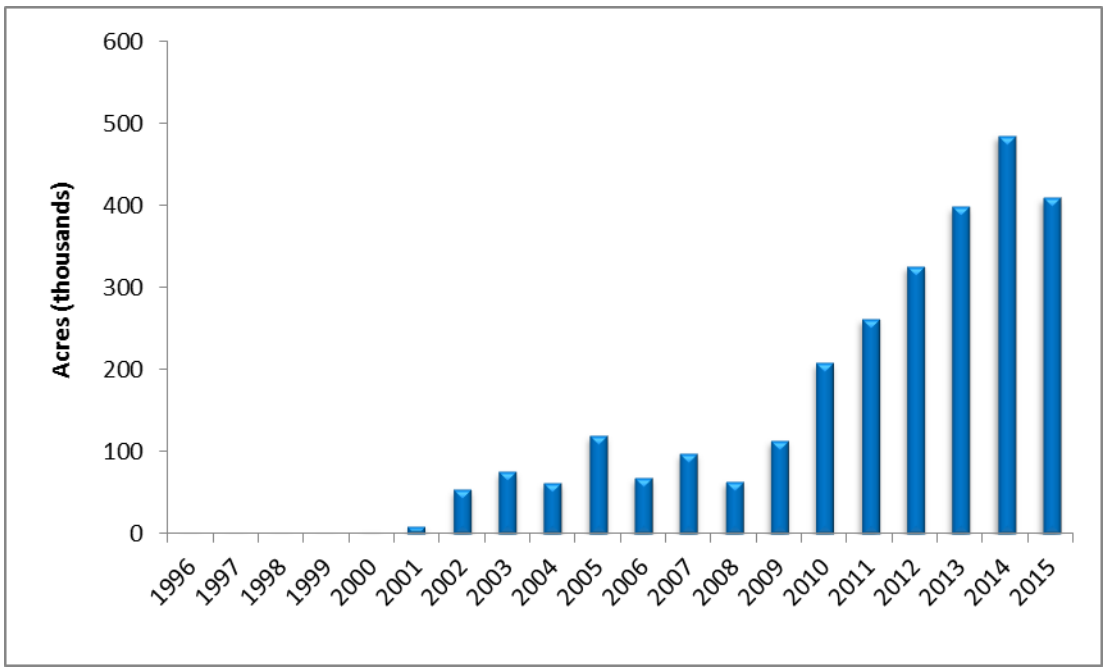

Figure 3. Annual acres affected by spruce beetle in Colorado.

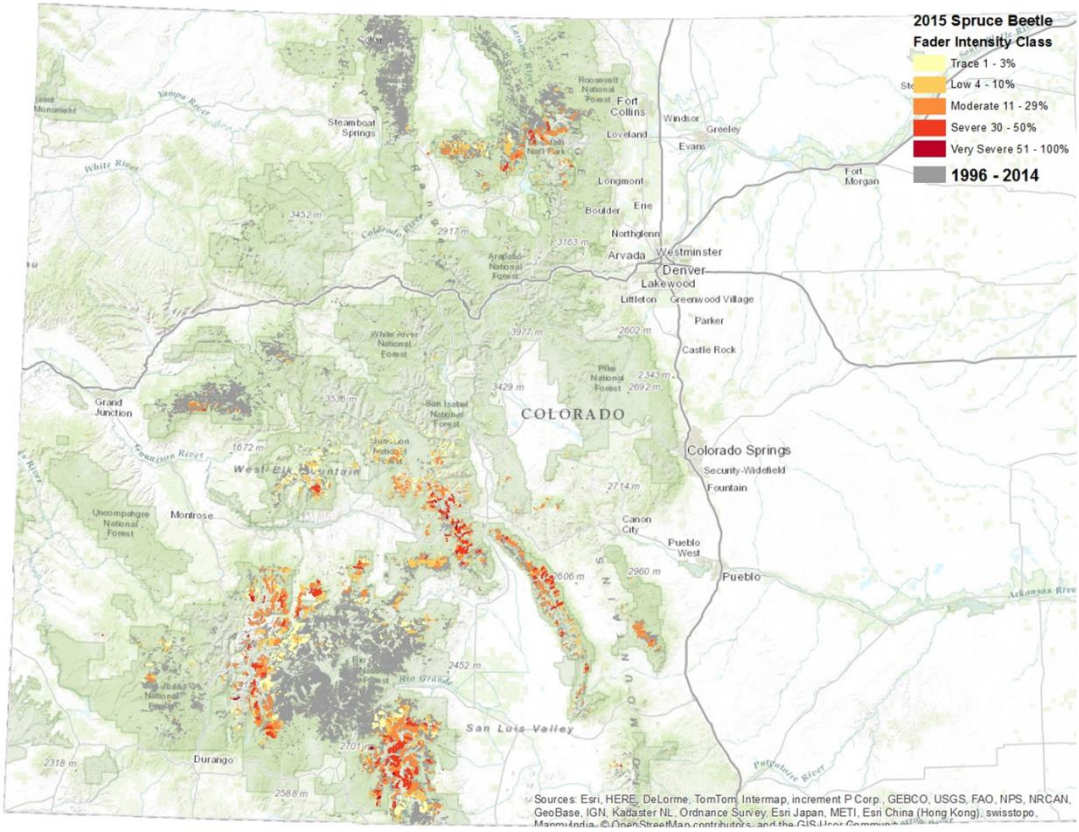

Figure 4. Spruce Beetle activity in Colorado 1996-2015.

Figure 5. A mix of recent and older mortality caused by spruce beetle on the Rio Grande National Forest. Photo: Justin Backsen.

Douglas-fir Beetle

- Douglas-fir beetle activity was detected on 12,000 acres and expanded onto 10,000 new acres in CO. In recent years, levels of Douglas-fir tree mortality have varied widely from scattered mortality in some stands to almost total loss of mature Douglas-fir in others. The mortality is geographically widespread and affects Douglas-fir in almost all locales throughout the state.

- Surviving trees within areas burned by the Little Sand Fire on the San Juan National Forest appear to have been successfully protected using the anti-aggregation pheromone MCH.

Western Balsam Bark Beetle

- Western balsam bark beetle activity was detected on 122,000 acres in subalpine fir across Colorado. These infestations are generally widespread but kill fewer trees per acre than other bark beetles currently active in the state. This tree mortality is often associated with root disease in high elevation forests.

Fir Engraver:

- Acres affected by fir engraver on white fir decreased in southwestern Colorado from approximately 43,000 acres in 2014 to 19,000 acres in 2015. Outbreaks of fir engraver beetle are often associated with localized drought conditions and may occur in areas where white fir has matured on sites more favorable to ponderosa pine.

Douglas-fir Tussock Moth

- Heavy defoliation of Douglas-fir by Douglas-fir tussock moth (Figure 6) was detected aerially in localized areas totaling 26,000 acres along the Front Range from Colorado Springs to Boulder. This is an increase from 400 acres mapped in 2014 surveys. Areas with affected Douglas-fir include Cheyenne Mountain, the Pike National Forest from Perry Park to Foxton, and a 190 acres on private land west of Boulder (Figure 7).

- Affected areas could suffer significant tree mortality depending on severity of defoliation. Some trees will recover and others may suffer damage such as top-kill. Defoliation can increase susceptibility to other insects, such as Douglas-fir beetle.

- Ground surveys have detected the presence of NPV (nuclear polyhedrosis virus) which is typically indicative of population collapse (Figure 8). Predators, parasites, and starvation also contribute to population collapse within a few years of an outbreak being detected.

Figure 6. Douglas-fir tussock moth larvae on blue spruce. Photo: Brian Howell.

Figure 7: Douglas-fir tussock moth defoliation at Perry Park. Photo: Dan West

Figure 8. Douglas-fir tussock moth infected with NPV.

Western Spruce Budworm

- Western spruce budworm activity increased in Colorado in 2015. Aerial surveys detected 312,000 defoliated acres in the state in 2015 compared to 178,000 acres in 2014.

- This insect is a defoliator that feeds on the new needles of white fir, Douglas-fir and less notably on spruce and subalpine fir (Figure 9).

- Activity was found mainly on the San Isabel, San Juan, and Rio Grande National Forests. Notable activity was also seen further north in 2015 on the Pike National Forest in areas that overlap with Douglas-fir tussock moth outbreaks.

Figure 9. Western spruce budworm larvae on Douglas-fir. Photo: Brian Howell

Western Tent Caterpillar and Large Aspen Tortrix

- Defoliation of aspen in 2015 was detected on 58,000 acres caused by western tent caterpillar with lesser amounts caused by large aspen tortrix (Figure 10). Defoliation can lead to tree mortality if it occurs repeatedly over several years, especially during droughts.

- Defoliated aspen typically grow new leaves in mid-late summer.

Figure 10. Aspen defoliation caused by large aspen tortrix or western tent caterpillar south of Blue Park on the Rio Grande National Forest. Photo: Justin Backsen, 2015.

Aspen Discoloration

- Discolored aspen foliage was detected on 81,000 acres in 2015 throughout aspen stands in Colorado. Discolored aspen foliage is typically caused by foliar diseases which are often associated with wetter than average spring and early summer weather. Ground checks have indicated that the majority of the aspen discoloration observed in 2015 is associated with Marssonina leaf blight (Figure 11), the most common leaf disease of aspen in our area. Although this disease causes defoliation, it is weather dependent it may be common one year and difficult to detect the next. Mortality associated with this disease is rare.

Figure 11. Aspen discoloration caused by Marssonina leaf blight on Grand Mesa NF. Photo: Justin Backsen.

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Pine Sawflies

- Pine sawfly populations declined dramatically in 2015 and only 820 aces of pine sawfly defoliation were detected by aerial survey. Extensive areas of nearly complete defoliation of ponderosa pine forests seen in 2014 improved greatly on private lands southeast of the community of Kiowa, especially along County Roads 73 and 77 (Figures 12 and 13).

Figure 12. Defoliation of ponderosa pine caused in 2014 by pine sawflies in Elbert County. Photo: Bill Ciesla

Figure 13. 2015 Recovery of ponderosa pine defoliated by pine sawflies in 2014. Photo: Bill Ciesla